भारतीय मानक

Indian Standard

IS 1167 : 2021

खाने योग्य कैसीन उत्पाद — विशिष्टि

(दूसरा पुनरीक्षण)

Edible Casein Products — Specification

(Second Revision)

ICS 67.100.01

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भारतीय मानक ब्यूरो
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Dairy Products and Equipment Sectional Committee, FAD 19

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Dairy Products and Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

Casein is the major protein of milk and it exists as a colloidal suspension. Since casein is a good protein nutritionally, it is used in the manufacture of protein foods for oral administration in cases which call for protein supplementation.

This standard was originally published in 1957 and first revised in 1965 to enlarge the scope to include products prepared by acid precipitation or natural souring, increasing the limit for moisture content to make it more realistic and addition of requirements like total acidity, free acidity and total bacterial count.

The second revision has been undertaken to harmonize the standard with Codex Standard (CXS 290-1995) and FSSAI Regulations and the major changes include:

a) Three types of edible casein products have been included, namely, acid casein, rennet casein and caseinate.
b) Alignment of chemical and microbiological requirements as per the *Food Safety and Standards* (*Food Products Standards and Food Additives*) *Regulations*, 2011.
c) The type of packaging materials that may be used for packaging of edible casein products has been included.

In the formulation of this standard, due consideration has been given to the *Food Safety and Standards Act*, 2006 and Regulations framed thereunder; the *Legal Metrology Act*, 2009 and Rules framed thereunder and the Essential Commodities Act, 1955. However, this standard is subject to restrictions imposed under these, wherever applicable.

The composition of the Committee responsible for formulation of the standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding-off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

EDIBLE CASEIN PRODUCTS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and methods of test for edible acid casein, edible rennet casein and edible caseinate in conformity with the description under **3** of this Standard, intended for direct consumption or further processing.

2 REFERENCES

The following standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS/ISO No.	*Title*
460 (Part 1) : 2020	Specification for test sieves: Part 1 Wire cloth test sieves (*fourth revision*)
2491 : 2013	Food hygiene — General principles — Code of practice (*third revision*)
5401 (Part 1) : 2012/ISO 4832 : 2006	Microbiology — General guidance for enumeration of coliforms: Part 1 Colony count technique (*second revision*)
5403 : 1999	Method for yeast and mould count of foodstuffs (*first revision*)
5887	Methods for detection of bacteria responsible for food poisoning
(Part 1 : 1976)	Isolation, identification and enumeration of *Escherichia coli* (*first revision*)
(Part 2) : 1976	Isolation, identification and enumeration of *Staphylococcus aureus* and faecal streptococci (*first revision*)
(Part 3) : 1999	General guidance on methods for the detection of Salmonella (*second revision*)
(Part 6) : 1999	Colony count technique at 30 °C (*first revision*)
10500 : 2012	Drinking water — Specification (*second revision*)
10171 : 1999	Guide on suitability of plastics for food packaging (*second revision*)
11078 : 2012	Round open top sanitary cans for milk powder — Specification (*second revision*)
11888 : 2005	Caseins and caseinates — Determination of content of scorched particles and of extraneous matter
11917 : 2018	Milk and milk products — Determination of nitrogen content — Kjeldahl principle and crude protein calculation (*first revision*)
11918 : 2017/ ISO 5546 : 2010	Caseins and caseinates — Determination of *pH* (reference method) (*first revision*)
11919 : 1987/ ISO 5544 : 1978	Method for determination of 'fixed ash' in caseins (Reference method)
11920 : 2012	Caseins and caseinates — Determination of moisture content (Reference method)
11963 : 2005	Caseins and caseinates — Determination of lactose content — Photometric method
11964 : 2012	Caseins — Determination of free acidity (Reference method)
14988 (Part 1) : 2020/ISO 11290-1 : 2017	Microbiology of food and feeding stuffs — Horizontal method for detection and enumeration of *Listeria monocytogenes*: Part 1 Detection method (*first revision*)

IS/ISO No.	*Title*
16072 : 2012	Determination of moisture content in milk powder and similar products (Routine Method)
5402 (Part 1) : 2021/ISO 4833-1 : 2013	Microbiology of the food chain — Horizontal method for the enumeration of microorganisms: Part 1 Colony count at 30 °C by the pour plate technique (*third revision*)
ISO 5543 : 2004	Caseins and caseinates — Determination of fat content — Gravimetric method (Reference method)
ISO 5738 : 2004	Milk and milk products — Determination of copper content — Photometric method (Reference method)
ISO/TS 6733 : 2006	Milk and milk products — Determination of lead content — Graphite furnace atomic absorption spectrometric method
ISO 15213 : 2003	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of sulfite reducing bacteria growing under anaerobic conditions
ISO 17997-1 : 2004	Milk — Determination of casein-nitrogen content — Part 1: Indirect method (Reference method)
ISO 17997-2 : 2004	Milk — Determination of casein-nitrogen content — Part 2: Direct method

3 DESCRIPTION

3.1 Edible Casein Products — Edible casein products are the products obtained by separating, washing and drying the coagulum of skimmed milk and/or of other products obtained from milk.

3.1.1 Edible Acid Casein — Edible acid casein is the product obtained by separating, washing and drying the acid-precipitated coagulum of skimmed milk and/or of other products obtained from milk.

3.1.2 Edible Rennet Casein — Edible rennet casein is the product obtained by separating, washing and drying the coagulum of skimmed milk and/or of other products obtained from milk. The coagulum is obtained through the reaction of non-animal rennet or other coagulating enzymes.

3.1.3 Edible Caseinate — Edible caseinate is the product obtained by reaction of edible casein or edible casein curd coagulum with neutralizing agents followed by drying.

4 REQUIREMENTS

4.1 Raw Materials

Skimmed milk, obtained by separation of whole milk/mixed milk etc. and/or other products obtained from milk.

4.2 Description

Casein shall be nearly white or pale cream in colour and shall have no undesirable odour or any foreign matter. It shall be free from any added colour.

4.3 Permitted Ingredients

4.3.1 Starter cultures of harmless lactic acid producing bacteria.

4.3.2 Non animal rennet or other safe and suitable coagulating enzymes.

4.3.3 Potable water conforming to IS 10500.

4.3.4 Edible acids.

4.3.5 Neutralizing agents.

4.4 Particle Size

The size of the particles shall be such that 100 percent by weight of casein shall pass through 500 micron IS Sieve [*see* IS 460 (Part 1)].

4.5 Hygienic Requirements

Casein shall be manufactured and handled under strict hygienic conditions as prescribed in IS 2491.

4.6 The material shall also comply with the requirements given in Table 1.

4.7 The product may contain permitted food additives within the limits as specified under the *Food Safety and Standards (Food Products Standards and Food Additives) Regulations*, 2011.

Table 1 Requirements for Edible Casein Products

(*Clause* 4.6)

Sl No.	**Characteristics**	**Requirements**			**Method of Test, Ref to IS/ISO**
		Edible Rennet Casein	Edible Acid Casein	Edible Caseinates	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Milk protein (on dry basis)[a], percent by mass, *Min*	84.0	90.0	88.0	IS 11917
ii)	Moisture[b], percent by mass, *Max*	12.0	12.0	8.0	IS 11920 or IS 16072
iii)	Casein in milk protein, percent by mass, *Min*	95.0	95.0	95.0	ISO 17997-1 or ISO 17997-2
iv)	Milk fat, percent by mass, *Max*	2.0	2.0	2.0	ISO 5543
v)	Ash (including P_2O_5), percent by mass, *Max*	7.5	2.5	–	IS 11919
vi)	Lactose[c], percent by mass, *Max*	1.0	1.0	1.0	IS 11963
vii)	Free acid, ml of 0.1 N NaOH per g, *max*	–	0.27	–	IS 11964
viii)	*p*H (in 10 percent solution), *Min*	–	–	8.0	IS 11918
ix)	Maximum sediment (scorched particles), mg/25 g, *Max*	15	15 (spray dried) 22.5 (roller dried)	15 (spray dried) 22.5 (roller dried)	IS 11888
x)	Copper (Cu), mg/kg, *Max*	5			ISO 5738
xi)	Iron (Fe), mg/kg, *Max*	20 50 (for roller dried caseinates)			ISO/TS 6733

a) Protein content is 6.38 multiplied by the total Kjeldahl nitrogen determined.

b) The water content does not include water of crystallization of the lactose.

c) Although the products may contain both anhydrous lactose and lactose monohydrate, the lactose content is expressed as anhydrous lactose. 100 parts of lactose monohydrate contain 95 parts of anhydrous lactose.

Table 2 Microbiological Requirements for Casein Product

(*Clause* 4.6)

Sl No.	**Characteristic**	**Requirement**				**Method of test, Ref to**
		Sampling Plan [1]		Limit (cfu)		
		n	c	m	M	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Aerobic plate count	5	2	3×10^4/ml	5×10^4/ml	IS 5402 (Part 1)
ii)	Coliform count	5	2	1/g	50/g	IS 5401 (Part 1)
iii)	*Staphylococcus aureus* (Coagulase positive)	5	2	10/g	1×10^2/g	IS 5887 (Part 2)
iv)	Yeast and Mould count	5	0	50/g	NA	IS 5403
v)	*Salmonella* sp.	5	0	Absent/25 g	NA	IS 5887 (Part 3)
vi)	*Listeria monocytogenes*	5	0	Absent/g	NA	14988 (Part 1)
vii)	*Bacillus cereus*	5	3	5×10^2/g	1×10^3/g	IS 5887 (Part 6)
viii)	Sulphite reducing clostridia	5	3	50/g	1×10^2/g	ISO 15213
ix)	*E. coli*	5	0	Absent/g	NA	IS 5887 (Part 1)

NOTE [1] For sampling plan see Annex A.

5 PACKING AND MARKING

5.1 Packing

The product shall be packed in clean and sound metal containers (*see* IS 11078) or glass containers or inert plastic containers like PET and HDPE Jars or in a food grade flexible pack made from a film or combination of any of the substrates made of board, paper, polyethylene, polyester metalized film or aluminium foil in such a way so as to protect it from deterioration. In the case of the plastic material, only food grade plastic (*see* IS 10171) of minimum thickness 0.05 mm shall be used.

5.2 Marking

5.2.1 The following information shall be marked legibly and indelibly on each container:

a) Name of the material (caseinate name with cation) and brand name if any;

b) Name and address of the manufacturer;

c) Batch or code number;

d) Month and year of manufacturing or packing;

e) Net quantity;

f) Direction for storage;

g) Best before .... (month and year in capital letters);

OR

Best before .... (months) from the date of packing/manufacture; and

h) Any other requirements under the *Food Safety and Standards* (*Packaging and Labelling*) *Regulations*, 2011 and the *Legal Metrology Act*, 2009 and Rules framed thereunder.

5.2.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

6 SAMPLING

Representative samples of the product shall be drawn and tested for conformity to this standard as prescribed in Annex B.

ANNEX A

[*Table* 2]

SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS

A-1 SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS

The terms n, c, m and M used in this standard have the following meaning:

n = Number of units comprising a sample.

c = Maximum allowable number of units having microbiological counts above m for 2-class sampling plan and between m and M for 3-class sampling plan.

m = Microbiological limit that separates unsatisfactory from satisfactory in a 2-class sampling plan or acceptable from satisfactory in a 3-class sampling plan.

M = Microbiological limit that separates unsatisfactory from satisfactory in a 3-class sampling plan.

A-2 INTERPRETATION OF RESULTS

2-Class Sampling Plan (where n, c and m are specified)	**3-Class Sampling Plan (where n, c, m and M are specified)**
1. Satisfactory, if all the values observed are ≤ m 2. Unsatisfactory, if one or more of the values observed are > m or more than c values are > m	1. Satisfactory, if all the values observed are ≤ m 2. Acceptable, if a maximum of c values are between m and M and the rest of the values are observed as ≤ m 3. Unsatisfactory, if one or more of the values observed are > M or more than c values are > m

ANNEX B

(*Clause* 6)

SAMPLING OF EDIBLE CASEIN PRODUCTS

B-1 GENERAL REQUIREMENTS OF SAMPLING

B-1.0 In drawing, preparing storing and handling samples the following precautions and protections shall be observed.

B-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

B-1.2 The sampling instrument shall be clean and dry when used. When taking samples for bacteriological examination, it shall also be sterile.

B-1.3 The samples, the material being sampled, the sampling instrument and the containers for sampling shall be protected from adventitious contamination.

B-1.4 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample. The sample containers shall, in addition, be sterile when they are used for samples for bacteriological examination.

B-1.5 Each sample container shall be sealed air-tight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particulars of the lot.

B-1.6 The samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature and that they are protected from light.

B-1.7 Sampling shall be done by a person agreed to between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

B-2 SCALE OF SAMPLING

B-2.1 Lot

In a single consignment all the containers containing the material of the same grade and the same batch of manufacture shall constitute a lot.

B-2.2 Sample shall be tested for each lot for ascertaining the conformity of the material for the requirements of this specification.

B-2.3 The number of containers to be selected from a Jot shall depend on the size of the lot and shall be in accordance with col 1 and 2 of Table 3.

B-2.4 These containers shall be chosen at random and for this purpose a random number table as agreed to between the purchaser and the vendor shall be used. In case such a table is not available the following procedure shall be adopted:

Starting from any container, count all the containers in one order as 1, 2, 3.... up to *r* and so on. Every r^{th} container so counted shall be withdrawn, where, is the integral part of *N*/*n*, *N* being the number of containers in the lot and *n* the number of containers to be selected.

B-3 PREPARATION OF SAMPLES

B-3.1 Individual Samples for Bacteriological Examination

Draw with in appropriate sampling instrument, which is sterile, about 300 g of the material from each selected container by taking small portions of the material from at least 10 different parts of the container. Thoroughly mix all Portions of the material drawn from the same container. Take about 100 g of the material and divide this material into three equal parts taking care not to bring any bacterial contamination. Each part so obtained shall constitute an individual sample representing the consignment and shall be transferred to sterile glass containers which shall be sealed air-tight and labelled with the particulars described in **B-1.5** and the words *'For microbiological Tests'*. The individual samples so obtained shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, another for the vendor and the third for the referee.

Table 3 Number of Containers to be Selected for Sampling

(*Clause* B-2.3)

Number of Containers in the Lot *N*	Number of Containers to be Selected *n*
1	1
2 to 8	2
9 to 25	3
26 to 50	4
51 to 300	5
301 to 500	6
501 and over	8

B-3.2 Composite Samples for Other Tests

From the mixed material from each selected container remaining after the individual sample has been taken, equal quantities of the material from each container, shall be taken and mixed together so as to give material representative of the lot and weighing not less than 200 g. This material shall be divided into three equal parts. Each part so obtained shall constitute a composite sample representing the lot and shall be transferred to a clean, dry container made of glass or tinplate and labelled with the particulars given in **B-1.5**. One of these composite samples shall be for the purchaser, another for the vendor and the third for the referee.

B-3.3 Referee Samples

Referee samples shall consist of a set of individual samples (**B-3.1**) and a composite sample (**B-3.2**) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place and under conditions agreed to between the purchaser and the vendor.

B-4 NUMBER OF TESTS

B-4.1 Tests for the determination of bacterial count shall he conducted separately on each of the samples constituting a set of individual samples (**B-3.1**).

B-4.2 Tests for the determination of the remaining characteristics shall be conducted on the composite sample (**B-3.2**).

B-5 CRITERIA FOR CONFORMITY

B-5.1 The lot shall be considered as conforming to the requirement of this specification when:

a) the test results for bacterial count satisfy the requirements specified in Table 2.

b) all the test results on the composite sample satisfy the respective requirements as specified in this specification.

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Dairy Products and Equipment Sectional committee, FAD 19

Organization	*Representative(s)*
National Dairy Research Institute, Karnal	Dr Manmohan Singh Chauhan (***Chairman***)
All India Food Processors Association, New Delhi	Dr K. L. Gaba Mr Vijay Gaur (*Alternate* I) Mr Santash Kumar (*Alternate* II)
Bihar State Cooperative Milk Producers' Federation Ltd, (COMPFED), Delhi	Mr Sushil Kumar Mr Rupesh Raj (*Alternate*)
CONCERT, Chennai	Mr K. Ramachandran Mr M. R. Krishnan (*Alternate*)
Confederation of Indian Food Trade & Industry, New Delhi	Ms Priyanka Gupta Dr Anirudha Chhonkar (*Alternate*)
Confederation of Indian Industry, New Delhi	Ms Neha Aggarwal Ms Arti Gupta (*Alternate*)
Centre for Analysis and Learning in Livestock and Food (CALF), Anand	Dr Rajesh Nair Dr Rajeev Chawla (*Alternate*)
Department of Animal Husbandry, Dairying & Fisheries, New Delhi	Mr Sagar Mehra Mr Rajesh Kumar Gupta (*Alternate*)
Directorate of Marketing and Inspection, Faridabad	Deputy Agricultural Marketing adviser Senior Marketing Officer-Standard (*Alternate*)
Export Inspection Council of India, New Delhi	Dr S. K. Saxena Mr Vikas Dahiya (*Alternate*)
Envirocare Labs Pvt Ltd, Thane	Mr Nilesh Amritkar Ms Sabeena K. (*Alternate* I) Ms Kavita Gokhale (*Alternate* II)
FICCI Research and Analysis Centre, New Delhi	Dr S. K. Manocha Dr Ajay Sharma (*Alternate*)
Food Safety and Standards Authority of India, New Delhi	Dr Monica Puniya Ms Tripti Tayal (*Alternate*)
Gujarat Cooperative Milk Marketing Federation Ltd, Anand	Mr Sameer Saxena Mr Sayan Banerjee (*Alternate*)
Haryana Dairy Development Coop Federation Ltd, Panchkula	Mr S. S. Kohli Mr Y. P. Singh (*Alternate*)
IDMC Ltd, Anand	Mr Devender Gupta Mr Prakash Maheshwari (*Alternate*)
Indian Dairy Association, New Delhi	Dr G. S. Rajorhia Dr Satish Kulkarni (*Alternate*)
Indian Stainless Steel Development Association, Gurugram	Mr Rohit Kumar Mr Rajat Aggarwal (*Alternate*)
Infant and Young Child Nutrition Council	Dr Nirupama Sharma Mr Kiran Desai (*Alternate*)
Jupitor Glass Works, New Delhi	Mr Karan Nangia Mr Amreek Singh Puri (*Alternate*)

Organization	*Representative(s)*
Mother Dairy Fruit and Vegetable Ltd, Delhi	Ms Nita Sen Mr Shailender Kumar (*Alternate*)
National Dairy Development Board, Anand	Dr R. S. Lahane Mr Suresh Pahadia (*Alternate*)
National Dairy Research Institute, Karnal	Dr Vivek Sharma Dr Rajesh Kumar Bajaj (*Alternate*)
National Institute of Food Technology Entrepreneurship & Management (NIFTEM), Sonipat	Dr P. K. Nema
National Institute of Nutrition, Hyderabad	Dr B. Santosh Kumar Dr Sylvia Fernandez Rao (*Alternate*)
Pradeshik Co-op Dairy Federation Ltd, Lucknow	Mrs Shabnam Chopra
Punjab State Coop Milk Producers' Federation Limited	Dr Brar
Rajasthan Co-op Dairy Federation (RCDF) Ltd, Jaipur	Mr J. D. Singh
Tamil Nadu Co-op Milk Producers' Federation Limited, Chennai	Mr S. R. Sankar Mr T. M. James Dinakaran (*Alternate*)
Tetra Pak India Pvt Ltd, Pune	Mr Shashikant Ramnath Suruse Mr Sameer Singh Suhail (*Alternate*)
Vimta Labs Limited, Hyderabad	Dr Jagadeesh Kodali Dr Muni Nagendra Prasad Poola (*Alternate*)
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Member Secretary

Dr Bhawana
Scientist 'D' (FAD), BIS

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